IN THE CLAIMS:

Please amend claims 1-6 and 10-13.

Please cancel claims ~~14-15~~

Regarding claim amendments, Applicants have attached to this Amendment a document entitled "Marked-Up Claim Amendments". A clean copy of amended claims is also enclosed herewith.

REMARKS

Entry of this Amendment and favorable reconsideration of this application, as presently amended, are respectfully requested

In this Amendment, claims 1-6 and 10-13 have been amended. No new matter or new issues are believed to be present in this Amendment. Claims 14-15 have been canceled. Thus, claims 1-6 and 10-13 are pending in this application.

In the Outstanding Office Action, claims 14 and 15 have been withdrawn from consideration as being directed to a non-elected invention. In this Amendment, Applicants have canceled claims 14 and 15.

Claims 1 and 2 have been rejected under 35 U.S.C.103(a) as being unpatentable over Cundiff et al (U.S. Patent No. 5,567,499) in view of Lubin (Handbook of Composites). The Examiner indicated that Cundiff et al. teaches the use of the uncured adhesive films as well as the use of uncured prepreg layers placed upon the cells of the honeycomb material, and further, that the use of uncured prepreg layers were taken as thermosetting sealing material. It is presumed that the Examiner meant that the prepreg layer of the reference were the same as thermosetting sealing material.

Furthermore, Lubin, Handbook of Composites, was relied on by the Examiner to show that a material which cured during bonding is a thermosetting material.

Moreover, the Examiner said the film and the prepreg material of Cundiff clearly prevented the resin used to impregnate the dry preform in the resin transfer molding operation from penetrating into the cells of the honeycomb and as such were clearly sealing

materials.

Claims 3-6 and 10-13 were rejected under 35 U.S.C.103(a) as being unpatentable over the references as set forth above in Cundiff and Lubin further in view of Fellman et al. (U.S. Patent No. 4,968,545), Ahrens (U.S. Patent No. 4,323,623) and Browne (U.S. Patent No. 4,861,649), oppotionally further taken with Narita (U.S. Patent No. 5,431,995).

Applicants respectfully traverse these rejections and request reconsideration for claims 1-6 and 10-13 based on reasons discussed herein.

Applicants' invention is related to a honeycomb sandwich composite panel made by using an RTM (Resin Transfer Molding) process. In previously known methods of forming honeycomb sandwich panels, disclosed in the specification page 1 lines 24 to page 2, line 7, in order to keep an impregnated resin from flowing into a honeycomb core, a prepreg material is used as a raw material. However, the use of the prepreg material requires high material cost and expensive facilities for the storage of materials and for a curing operation, in particular, it would create a problem of cost reduction of composite materials.

To solve this problem, as a method of forming honeycomb sandwich composite panel without using the prepreg material, Applicants' invention recited in claims 1 and 2 forms the panel by providing a thermosetting sealing material between a dry fabric and both sides of the honeycomb core, where the thermosetting sealing material is a resin film including glass microspheres (microbaloons) to adjust viscosity of the resin film and having an adhesive property for joining the honeycomb core to the dry fabric and with a sufficient sealing effect to prevent the resin from flowing into the honeycomb core during resin impregnation. Specific structures are shown in the specification in page 7, line 3-25 and Figures 3 to 6.

In this Amendment, Applicants have amended the claims to recite "essentially consisting of" as the transitional phrase to thereby clarify that the prepreg material is not used in the claimed method of forming.

The feature of Applicant's invention is to use the resin film including glass microspheres to adjust viscosity of the resin film as the thermosetting sealing material

without using the prepreg material. The claims now more clearly point this out. By this invention, cost reduction is achieved.

In contrast to Applicants' invention, Cundiff discloses the honeycomb sandwich composite panel by using an RTM (Resin Transfer Molding) process with the honeycomb core, adhesive film and prepreg material and dry fabric.

Accordingly, Cundiff discloses, as an essential component, the prepreg material as a composite of the honeycomb sandwich composite, and hence there is difference between Applicants' invention and Cundiff at the point of the presence of the prepreg material. As discussed above, Applicants' invention uses the resin film including glass microspheres (microbaloons) to adjust the viscosity of the resin film and having an adhesive property for joining the honeycomb core to the dry fabric and a sufficient sealing effect to prevent the resin from flowing into the honeycomb core during resin impregnation. This feature is not suggested or taught by Cundiff. Nothing in Cundiff would motivate a person skilled in the art to omit the prepreg component.

Regarding Lubin, as the Examiner indicated, the "Handbook of Composites" discloses that a material which cures during bonding is a thermosetting material. Accordingly, Lubin only discloses that a curable material is in fact thermosetting, there is no teaching or suggestion about the use of the thermosetting sealing material including glass microspheres as sealing material. Furthermore, there is
no teaching or suggestion of using the thermosetting sealing material including glass micorspheres instead of the prepreg material.

Accordingly, even if the teachings of Cundiff are modified in view of Lubin, the invention recited in claims 1 and 2 would not be obtained.

For this reason, Applicants believe that claims 1 and 2 are patentable over the references and respectfully request reconsideration of this application.

The Examiner indicated based on Fellman et al., Ahrens et al., Browne, and Narita, that the use of syntactic foam which included resin and glass microshprers instead of the resin film and/or prepreg material would have been obvious.

However, Applicants respectfully state that Fellman et al., Ahrens et al., Browne

and Narita disclose the laminated structure of the prepreg and the syntactic foam. Accordingly, the prepreg material is used as one of composite materials for forming the product. Hence, there is no suggestion or teaching of forming the honeycomb sandwich composite panel without the prepreg material. Furthermore, there is no suggestion or teaching of using the glass microspheres to adjust viscosity of the resin film and having an adhesive property for joining the honeycomb core to the dry fabric and a sufficient sealing effect to prevent the resin from flowing into the honeycomb core during resin impregnation.

Thus, even if the combination of Cundiff and Lubin is modified in view of Fellman et al. , Ahrens and Browne, optionally further taken with Narita, the invention recited in claims 1 and 2 would not be obtained.

For this reasons, Applicants believe that claims 1 and 2 are patentable over the references and respectfully request the reconsideration of this application.

Regarding claims 3 and 10, these claims are dependent claims which depend from claim 1 or 2 (claim 3 depends from claim 1, claim 10 depends from claim 2), and define that the thermosetting sealing material comprises a laminated film formed by laminating a plurality of thermosetting resin films. This feature, in particular of, laminating a plurality of thermosetting resin films is not disclosed in the references. Furthermore, for the same reason as claims 1 and 2, Applicants believe that claims 3 and 10 are patentable over the references.

Regarding claims 6 and 13, these are related to the method of forming a honeycomb sandwich composite panel with laminating a dry fabric on both sides of the honeycomb core with a sealing material, in particular, the sealing material is laminated by a plurality of thermosetting resin adhesive films so as to prevent the impregnated resin from flowing into the dry fabric without using the prepreg material.

In contrast to Applicants' invention, Cundiff discloses, as discussed in connection with claim 1, the honeycomb sandwich composite panel is made by using an RTM (Resin Transfer Molding) process with the honeycomb core, adhesive film and prepreg material and dry fabric. Accordingly, Cundiff requires the prepreg material, as an essential component. Applicants' claims exclude the prepreg material and nothing in Coundiff

suggests that the prepreg can be eliminated.

Furthermore, the other references do not teach or suggest the laminating the thermosetting sealing material instead of using the prepreg material. That is, the other references use the prepreg material as one of essential composite materials. For this reason, Applicants believe that claim 6 is patentable over the references.

Regarding claims 4-5, and 11-12, these are dependent claims which depend from claim 6 or 10 (claims 4-5 depend from claim 6, claims 11-12 depend from claim 13). These claims define the specific lamination of the thermosetting sealing material. For the same reason as given regarding claims 6 and 10, Applicants believe that claims 4-5 and 11-12 are patentable over the references.

In view of above, Applicants request that the rejection be withdrawn and the claims be allowed at the Examiner's earliest convenience.

Respectfully submitted,

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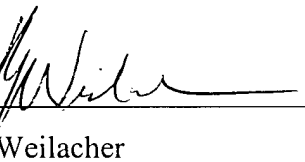
By: 

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Marked-Up Version of the Claims

1. (amended) A method of forming a honeycomb sandwich composite panel [comprising] consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

heating said sealing material and said dry fabric at the curing temperature of said sealing material to cause initial hardening of said sealing material and to dry fabric and to seal;

impregnating said dry fabric with a thermosetting resin; and

hardening the resin impregnated into said dry fabric by hot-pressing an entire assembly thus prepared under specific conditions,

said sealing material being a resin film including glass microspheres to adjust viscosity of said resin film having in addition to said adhesive property a sufficient sealing effect to prevent the resin from flowing into the honeycomb core during said impregnating step.

2. (amended) A method of forming a honeycomb sandwich composite panel [comprising] consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

hardening said sealing material by heating said sealing material and said dry fabric to the curing temperature of said sealing material and maintaining this temperature for a specified period of time;

impregnating said dry fabric with a thermosetting resin while varying the temperature of said sealing material and said dry fabric to a resin impregnating temperature and maintaining this temperature for a specified period of time; and

hardening the resin impregnated into said dry fabric by heating said sealing material and said dry fabric to the curing temperature of said thermosetting resin and hot-pressing

them for a specified period of time,

said sealing material being a resin film including glass microspheres to adjust viscosity of said resin film having in addition to said adhesive property a sufficient sealing effect to prevent said thermosetting resin from flowing into said honeycomb during said impregnating step.

3. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 1, wherein

said sealing material is a laminated film formed by laminating a plurality of thermosetting resin films [in which glass microbaloons are mixed to adjust viscosity of said thermosetting resin films].

4. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim [1] 6, wherein

said [sealing material] plurality of thermosetting resin films [is a laminated film formed of] includes at least two thermosetting resin adhesive films and,

a carrier material is placed between said thermosetting resin adhesive films to be used as an adhesive film of said thermosetting resin adhesive films.

5. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim [1] 6, wherein

said [sealing material] plurality of thermosetting resin films [is a laminated film formed of] includes at least two thermosetting resin adhesive films and,

a thermosetting resin film is placed between the thermosetting resin adhesive films, with glass microbaloons mixed in said thermosetting resin film.

6. (amended) [The method of forming the honeycomb sandwich composite panel as defined in claim 1, wherein] A method of forming a honeycomb sandwich composite panel except for the use of a prepreg material consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

heating said sealing material and said dry fabric at the curing temperature of said sealing material to cause initial hardening of said sealing material and to dry fabric and to seal;

impregnating said dry fabric with a thermosetting resin;

hardening the resin impregnated into said dry fabric by hot-pressing an entire assembly thus prepared under specific conditions: and

said sealing material [is] being a laminated film formed by laminating a plurality of thermosetting resin adhesive films.

10. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 2, wherein

said sealing material is a laminated film formed by laminating a plurality of thermosetting resin films [in which glass microbaloons are mixed to adjust viscosity of said thermosetting resin films].

11. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim [2] 13, wherein

said [sealing material] plurality of thermosetting resin films [is a laminated film formed of] includes at least two thermosetting resin adhesive films and,

a carrier material is placed between said thermosetting resin adhesive films to be used as an adhesive film of said thermosetting resin adhesive films.

12. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim [2] 13, wherein

said [sealing material] plurality of thermosetting resin films [is a laminated film formed of] includes at least two thermosetting resin adhesive films and,

a thermosetting resin film is placed between the thermosetting resin adhesive films, with glass microbaloons mixed in said thermosetting resin film.

13. (amended) [The method of forming the honeycomb sandwich composite panel as defined in claim 2, wherein] A method of forming a honeycomb sandwich composite panel

except for using the prepreg material consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

hardening said sealing material by heating said sealing material and said dry fabric to the curing temperature of said sealing material and maintaining this temperature for a specified period of time;

impregnating said dry fabric with a thermosetting resin while varying the temperature of said sealing material and said dry fabric to a resin impregnating temperature and maintaining this temperature for a specified period of time; and

hardening the resin impregnated into said dry fabric by heating said sealing material and said dry fabric to the curing temperature of said thermosetting resin and hot-pressing them for a specified period of time,

said sealing material [is] being a laminated film formed by laminating a plurality of thermosetting resin adhesive films.

Clean Version of the Claims

1. (amended) A method of forming a honeycomb sandwich composite panel consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

heating said sealing material and said dry fabric at the curing temperature of said sealing material to cause initial hardening of said sealing material and to dry fabric and to seal;

impregnating said dry fabric with a thermosetting resin; and

hardening the resin impregnated into said dry fabric by hot-pressing an entire assembly thus prepared under specific conditions,

said sealing material being a resin film including glass microspheres to adjust viscosity of said resin film having in addition to said adhesive property a sufficient sealing effect to prevent the resin from flowing into the honeycomb core during said impregnating step.

2. (amended) A method of forming a honeycomb sandwich composite panel consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

hardening said sealing material by heating said sealing material and said dry fabric to the curing temperature of said sealing material and maintaining this temperature for a specified period of time;

impregnating said dry fabric with a thermosetting resin while varying the temperature of said sealing material and said dry fabric to a resin impregnating temperature and maintaining this temperature for a specified period of time; and

hardening the resin impregnated into said dry fabric by heating said sealing material and said dry fabric to the curing temperature of said thermosetting resin and hot-pressing them for a specified period of time,

said sealing material being a resin film including glass microspheres to adjust viscosity of said resin film having in addition to said adhesive property a sufficient sealing

effect to prevent said thermosetting resin from flowing into said honeycomb during said impregnating step.

3. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 1, wherein

said sealing material is a laminated film formed by laminating a plurality of thermosetting resin films.

4. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 6, wherein

said plurality of thermosetting resin films includes at least two thermosetting resin adhesive films and,

a carrier material is placed between said thermosetting resin adhesive films to be used as an adhesive film of said thermosetting resin adhesive films.

5. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 6, wherein

said plurality of thermosetting resin films includes at least two thermosetting resin adhesive films and,

a thermosetting resin film is placed between the thermosetting resin adhesive films, with glass microbaloons mixed in said thermosetting resin film.

6. (amended) A method of forming a honeycomb sandwich composite panel except for the use of a prepreg material consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

heating said sealing material and said dry fabric at the curing temperature of said sealing material to cause initial hardening of said sealing material and to dry fabric and to seal;

impregnating said dry fabric with a thermosetting resin;

hardening the resin impregnated into said dry fabric by hot-pressing an entire assembly

thus prepared under specific conditions: and

said sealing material being a laminated film formed by laminating a plurality of thermosetting resin adhesive films.

10. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 2, wherein

said sealing material is a laminated film formed by laminating a plurality of thermosetting resin films.

11. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 13, wherein

said plurality of thermosetting resin films includes at least two thermosetting resin adhesive films and,

a carrier material is placed between said thermosetting resin adhesive films to be used as an adhesive film of said thermosetting resin adhesive films.

12. (amended) The method of forming the honeycomb sandwich composite panel as defined in claim 13, wherein

said plurality of thermosetting resin films includes at least two thermosetting resin adhesive films and,

a thermosetting resin film is placed between the thermosetting resin adhesive films, with glass microbaloons mixed in said thermosetting resin film.

13. (amended) A method of forming a honeycomb sandwich composite panel except for using the prepreg material consisting essentially of the steps of:

stacking a dry fabric on both sides of a honeycomb core with a thermosetting sealing material having an adhesive property placed in between;

hardening said sealing material by heating said sealing material and said dry fabric to the curing temperature of said sealing material and maintaining this temperature for a specified period of time;

impregnating said dry fabric with a thermosetting resin while varying the temperature

of said sealing material and said dry fabric to a resin impregnating temperature and maintaining this temperature for a specified period of time; and

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hardening the resin impregnated into said dry fabric by heating said sealing material and said dry fabric to the curing temperature of said thermosetting resin and hot-pressing them for a specified period of time,

said sealing material being a laminated film formed by laminating a plurality of thermosetting resin adhesive films.